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AUTHOR Schafer, Robert
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ABSTRACT

This paper analyzes three theories of racial discrimination by arguing that a dual housing market, a strong white taste for segregation, and pure racial price discrimination are all operative in the Boston urbanized area. Research dealing with discrimination and price differentials in housing for blacks is reviewed. It is pointed out that there are substantial neighborhood mark-ups that blacks must pay in ghetto and transition areas if they are to increase their housing consumption and that there is a willingness on the part of whites to pay more for otherwise identical housing that is located further from black residence areas. Evidence is also provided to show that blacks nearly always pay more than whites for the same bundle of housing attributes at the same location. Tables showing statistical data are included.
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Department of City and Regional Planning

Harvard University
Cambridge, Massachusetts

Racial Discrimination in the Boston Housing Market*

Robert Schafer

Racial segregation pervades America's urban housing markets. Negroes are more residentially segregated than any other minority and socio-economic factors do not account for more than a small fraction of this segregation.¹ Although substantial numbers of low income white families live in the suburbs, only a few of the low income Negro families live in these suburbs. The same is true of high income families. The data in Table 1 confirm this pattern for the 15 largest metropolitan areas in 1970. For example, 70.5 percent of the low income white families in the Boston metropolitan area live in the suburbs, while only 9.1 percent of the low income black families live in the suburbs. The picture is similar for high income households: 84.6 percent of high income white families live in the suburbs, while only 28.7 percent of high income black families live in the suburbs. In fact the percentage of high income black families living in the suburbs is substantially less than the percentage of low income white families that do.

Racial segregation in the housing market is, in large part, the result of discrimination. There is, however, a good deal of controversy over the nature of this discrimination, especially the relationship between housing prices and race. Although there seemed to be a

growing consensus that "otherwise identical" housing units are more expensive in the black ghetto than in the white submarket at the same point in time,² some new studies of more recent periods have cast doubt on this conclusion. Ann Schnare's analysis of the Boston and Pittsburgh housing markets finds that ghetto markups which were present in 1960 disappeared by 1970, and suggests that price differentials between the white and black submarkets are largely a function of changes in the conditions of supply and demand in the two submarkets.³ Brian Berry has also found that in 1971 blacks in the Chicago metropolitan area "were paying less than the white majority for housing systematically controlled... for quality, improvements and other neighborhood factors."⁴ The relationship between housing prices and race has important implications for the formulation of fair housing laws and the approach of the courts to litigation under the Civil Rights Acts.⁵

The studies by Schnare and Berry estimate models that assume a unified housing market. As a result, imputed prices of housing attributes cannot vary with location, and the analyses obscure important racial price differentials. This paper analyzes the same Boston housing market that Schnare studied, but estimates models based on a more realistic and complex housing market theory than that implicit in the analysis by Schnare, Berry, and many others. This more adequate model specification indicates that housing prices are substantially higher in the ghetto and transition areas than in white areas, and that within the same area blacks must pay more than whites for equivalent housing.

Theories of Racial Discrimination

The prices of otherwise identical housing units may differ for whites and blacks for at least three different, but not necessarily mutually exclusive, reasons. First, racial price differentials would result if white

landlords and other real estate actors charge blacks more than whites. This is the case of pure racial price discrimination. Blacks pay more than whites for the same dwelling unit. It involves discrimination by landlords, etc. against individual households on the basis of race. Landlords might discriminate in this manner for at least three different reasons: their own racial prejudice, profit maximization in the presence of racially prejudiced tenants, or the exercise of monopoly power in the black submarket. (The latter reason is implausible because of the relatively large number of landlords in the black submarket.) As a result, this theory predicts that blacks pay more than whites for identical housing at all locations in a metropolitan area.

The second theory derives racial price differentials from differences in the tastes of blacks and whites for the racial composition of their neighborhood.⁶ The most common set of assumptions about tastes are that whites prefer segregation and blacks prefer integration. Under this set of assumptions whites would pay a premium to live away from the black neighborhoods and blacks would pay a premium to live closer to white neighborhoods. Therefore, the white price will be higher in the white interior than at the white-black boundary, the black price would be higher at the white-black boundary than in the black interior, and nothing can be said about the price in the white interior relative to the price in the black interior. Of course, a different set of taste assumptions would produce a different price pattern.⁷ For example, if both whites and blacks preferred segregation, the white price would be highest in the white interior and the black price would be highest in the black interior to form a u-shaped curve. In any case, the price differentials operate on a neighborhood rather than an individual basis.

The third theory argues that a premium must be paid by blacks to add housing to the ghetto because of collusive behavior among white actors in the housing market.⁸ As a result, prices inside the

black submarket exceed the prices for similar housing in the white submarket. In addition, the racial price markup may be larger the further the housing bundle is from the boundary of the ghetto. The size of these markups depends on the extent of prejudice, the degree of market organization, and the mechanisms available to enforce the market separation. This theory requires a high degree of market organization, which may seem unrealistic. However, it has not been long since housing market actors engaged in open and explicit collusion to regulate the housing opportunities of blacks.

It was not until 1948 that the Supreme Court outlawed the enforcement of racially restrictive covenants in deeds,⁹ and these covenants did not disappear because the courts were no longer enforcing them.¹⁰ From 1935 to 1950 the federal government encouraged racial discrimination; for example, FHA prepared a racial covenant for builders to use.¹¹ In 1950 the code of ethics of the National Association of Real Estate Boards openly discouraged integrated housing,¹² and many analysts feel that brokers still screen applicants on the basis of race but with greater care to avoid violating new fair housing legislation.¹³ The large-scale building methods, which were introduced just after World War II, and active racial discrimination by the American homebuilder produced totally white communities. The numerous suburban communities that were built subject to these practices extended and intensified racial segregation.¹⁴ In 1954, the National Association of Homebuilders adopted a program of providing blacks with separate but equal housing.¹⁵ In addition mort-

gage lenders would only lend to blacks if the property was located in an established black neighborhood, and many of these lenders also tended to classify all blacks together as a bad credit risk.¹⁶ It was 1962 before it became the policy of the federal government to prevent discrimination in federally assisted housing.¹⁷ But conventionally financed housing transactions were not covered until the Fair Housing Act of 1968, which still excluded certain transactions. However, the Supreme Court decision of Jones v. Mayer in 1968 banned discrimination in even these excluded categories through an interpretation of the Civil Rights Act of 1866.¹⁸ Even with these laws, the Department of Housing and Urban Development, which is charged with a major responsibility for executing the 1968 Act, has not been very forceful in its enforcement efforts. It has taken private litigation to force HUD to do even the minimum required.¹⁹ It should be no surprise that the explicit collusion of the past continues to operate in a refined and more subtle manner. Furthermore, private individuals acting alone or in small groups have done much to make black families feel unwelcome in white areas;²⁰ the resultant real and large psychological costs that blacks face in a move to a white area play a substantial role in supporting an exclusionary housing market.

If blacks preferred segregation and whites preferred integration or were indifferent or blacks had a stronger preference than whites for segregation, the second theory (taste differentials) would predict a pattern of neighborhood price differentials similar to the third theory (higher ghetto prices). Comparison of price differentials

would not allow us to distinguish these explanations. However, a considerable body of survey research indicates that the underlying assumption that blacks prefer segregation is not true. In 1963, 64 percent of a random sample of blacks favored living in integrated neighborhoods and by 1966, the percentage had increased to 68.²¹ At the same time only 20 percent (1963) and 17 percent (1966) favored all-black neighborhoods. Thomas Pettigrew reviewed several studies of black attitudes toward racial integration and found that:

When presented with a meaningful choice between an all-black neighborhood and a mixed neighborhood, black respondents overwhelmingly favored the latter. This trend is clearest for respondents outside the South; yet in 1969, 63 percent of even low-income black Southerners favored desegregated residential areas. Those who favored mixed areas made it clear that they did so for positive reasons of racial harmony even more than for the obvious advantages of good neighborhoods. Similarly, those who preferred all-black areas made it equally clear that their reasons center around a desire to avoid interracial tension and strife.²²

The rising black consciousness of the 1960's ("black is beautiful," "black power") is evidence of a growing cultural pride but not an explanation of the pre-existing and durable patterns of residential segregation.

Short-run dynamics may modify the price differentials, if any,

between black and white individuals and/or neighborhoods. For example, an excess supply of housing available to blacks could eliminate any observable price differentials. In fact, the essence of Schnare's analysis is that the price differentials that were detected in the 1950's and 1960's were due to large increases in black demand and that when this demand was accommodated in the late 1960's, the price differentials disappeared by 1970. She points to the equilibrium "possibility of complete segregation with inter-zonal price equality."²³

Since the theories lead to different policy recommendations, it is important to evaluate each theory. The most common version of the "tastes for segregation" theory suggests that open-housing laws and similar schemes are doomed to failure because the whites that are adverse to racially integrated living will move out. As a result, ghetto expansion may be facilitated but racial integration would not follow. These theorists suggest that a policy of subsidizing whites to live in racially integrated communities would be most effective.²⁴ The pure racial price discrimination theory suggests full enforcement of equal housing opportunity laws to the extent of insuring price equality, much as a court has recently done in Chicago.²⁵ The collusive behavior theory suggests full enforcement of open occupancy laws, increased access of blacks to housing information (sales and rentals) in the white submarket, conditioning state and federal grants to local communities on satisfactory performance of equal housing opportunity requirements, and other similar programs. In addition, there are policies which could be supported under all three views that would

lead to dispersed ghettos, that is, to small suburban ghettos at several locations throughout the metropolitan area. For example, quotas would lead to this result if the self-segregation theory dominates behavior, but might lead to integrated housing under the market imperfections theory.

Most previous studies have found that blacks pay more than whites for comparable housing units. Muth found price markups of 10-20 percent for owner-occupied housing and 5 percent for renter-occupied housing in Chicago for 1950-60.²⁶ Ridker and Jenning found a 5-8 percent price markup for owner-occupied housing in St. Louis in 1960.²⁷ Another study of St. Louis by Kain and Quigley estimated that black renters paid 12-18 percent more than white renters, and that black owners paid 5-6 percent more than whites for comparable housing in 1967.²⁸ King and Mieszkowski have estimated that black renters in New Haven paid as much as 22 percent more than white renters in 1968-1969.²⁹ Prior to the Schnare and Berry papers, only two studies reported contrary findings. Bailey's analysis found no evidence of price markups in 1948-51 but is subject to several criticisms including the fact that he studied houses that whites may have preferred because they were in the vicinity of the University of Chicago.³⁰ Lapham's analysis is very weak because it does not control the effects of neighborhood conditions on housing prices.³¹ As we will see, the Schnare and Berry papers also have methodological weaknesses.

Methodology

A major problem in the analysis of housing price differentials

is the heterogeneity of housing. Housing is a heterogeneous commodity whose attributes vary from structural characteristics such as the type of building materials to the quality and quantity of various public services such as education. When households rent or buy housing, they purchase a bundle of attributes that includes the floor area, room size, number of rooms, number of bathrooms, plumbing and kitchen facilities, heating systems, and type of structure (single family, two family or multifamily). The housing that they rent or buy also has a fixed location. It is this locational aspect of the bundle that ties the choice of housing to the selection of levels of public services and to neighborhood effects. The location determines the type of recreation facilities, education program, etc., that the new tenant or owner will receive during their residency. Of course, they can participate in the local political process for alternative packages of publicly provided services, but they are unlikely to have a major impact in the immediate future. For the most part, basic differences in packages of public services are selected by voting with your feet rather than with your ballot. The location also determines the type of neighborhood; that is, the condition of surrounding buildings, and the characteristics of the neighbors. Finally, but not least, location determines the household's out-of pocket and time expenditures for travel to other activities, including work.

The market place does not contain all the possible bundles of housing attributes. As a result, households usually have to make trade-offs between different characteristics that they would like their hous-

ing to possess. The wide variety of attributes that are found in any housing bundle and the fact that each attribute is not individually and separately for sale in the housing market have made housing market analysis very difficult.

The hedonic price index technique, which was employed by Schnare and Berry, relates the price of a bundle of housing attributes to each individual attribute.³² Schnare and Berry estimate a single equation model of the entire metropolitan housing market, which assumes that a single unified housing market exists. As a result, the imputed price of each attribute is forced (by the estimated model) to have the same value throughout the urbanized area. Since housing is very heterogeneous and durable, we would expect different price differentials between white and black submarkets for different bundles of attributes. The collusive behavior theory would clearly suggest such a dual housing market. Unfortunately, the Schnare and Berry analyses do not allow one to study these differentials, and this is the most important flaw in their analysis. Furthermore, it would be interesting to study whether pure racial price discrimination is at work in one or more of these racially defined submarkets.

Schnare estimated her hedonic price index in two steps that were apparently designed with the limitations of 1960 Census data in mind. In the first step she estimated a relationship between rents (and values) on individual units and the structure-specific characteristics of these units. In the 1970 equation, she also included measures of neighborhood quality, which were not available for 1960. Next, she calculates the difference between the average rent in each census tract and the predicted "rent" based on the average values of the structure-specific

attributes of each tract and their estimated coefficients from the first step, but excluding the neighborhood attributes. This difference, which is attributed to neighborhood variation, is then used as a dependent variable in a second step that uses census tract statistics to characterize the neighborhood. This is indeed an ingenious but risky manipulation of the basic model that enriches the content of the 1960 Census. However, it is unnecessary for the 1970 Census because the neighborhood characteristics file from the Census Bureau's Public Use Samples contains information on the structure-specific and neighborhood attributes of individual dwelling units.³³

The estimates of the structure-specific coefficients in Schnare's first step will only be unbiased if these variables are orthogonal to the excluded neighborhood variables, which is not very likely. Schnare argues that she can check this in her 1970 equation because of the Public Use Sample (and she does this), but this is the very reason that the two step procedure is no longer necessary in 1970. It should be pointed out, however, that the two-step procedure allows the addition of some measures of public services and access to employment that are not on the Public Use Sample. At the same time, the public service attributes are probably fairly correlated with the neighborhood characteristics that are available, and information is available on location through the values of some of the neighborhood characteristics and the central city-suburban designation.

We estimate hedonic price indexes for both a unified housing market and dual housing markets. Although our original equations differed in minor ways from Schnare's, we respecified them to follow her functional form and variable selection to facilitate comparison because the results were substantially the same. The logarithm of rent is assumed to be a linear and additive function of various structure-specific and neighborhood attributes, which will be discussed in detail in the following section. Important price differentials that are averaged out in the unified approach show up in the dual market approach.

Measures of Housing Attributes

The 15 percent neighborhood characteristics file from the Census Bureau's Public Use Samples of the 1970 Census of Population and Housing provide the data base for our investigations. The neighborhood characteristics file contains detailed information on the household, each member of the household, the housing unit and the neighborhood in which the housing unit is located for one percent of the population. This is the first time the Census Bureau has provided such detailed information including the neighborhood description, and these files should be very valuable in the study of a wide variety of issues. One drawback is that the files are only available by Cen-

sus Divisions, which has the effect of grouping households from different metropolitan areas. The record on each household does contain information on the size of the urbanized area, which allows the analyst to identify the households that live in a few urbanized areas. Since the Boston urbanized area is the only one with more than a million persons (1970) in the New England division, it is possible to identify all the households on the New England file that live in the Boston area. An extract of the neighborhood characteristics file that contains only these Boston households constitutes the data base for our hedonic price indexes.

Although the household and housing characteristics in combination with the neighborhood's characteristics is a major breakthrough in the availability of Census data, there are still several drawbacks to using these census data in constructing hedonic price indexes for housing. (The Schnare study was also subject to these shortcomings.) The main difficulty is the incomplete description of the housing bundle. Although there is ample information about the physical attributes of the housing, there is no information about their quality. Unlike the 1960 Census of Housing, the 1970 one did not attempt a direct evaluation of whether the housing was sound, deteriorating or dilapidated. This inadequacy remains as a major caveat to what follows. The extent to which variations in these factors can be picked up by such variables as the presence of all plumbing facilities will tend to minimize the impact on our results. In any case, it is well to remember that the quality data from the 1960 Census was not very

reliable; in fact, this was one of the reasons for discontinuing the effort.

The dependent variable in our hedonic price index is logarithm of the gross monthly rent; that is, it is the rent including the cost of utilities. The independent variables are listed in Table 2, which is the estimate of the model for a unified housing market. The number of rooms, and the variables describing the neighborhood are interval scale variables. All the remaining variables are dummy variables. For example, the variable "two family structure" takes on the value of 1 if the household lives in a two family structure and the value of zero if it does not. The neighborhood characteristic variables are the fraction of households (or persons, or housing units) in the area that possess certain characteristics. For example, one of these variables is the fraction of families with annual incomes over \$15,000. The variables describing the income (average neighborhood income) and density (fraction of neighborhood's housing units that are single family) were selected on the basis of some recent studies by John Kain and William Apgar that show these variables to be successful descriptors of differences in neighborhood attributes.³⁴ Their work was based on census tract information for Pittsburgh and has recently been replicated for Boston. Since the neighborhoods on the Public Use Sample are roughly the size of census tracts, the Kain-Apgar results provide a relevant starting place in describing the neighborhood attributes. Additional neighborhood variables have been included; proportion multifamily, proportion high status,³⁵ proportion

high valued,³⁶ proportion vacant, proportion black, and proportion Puerto Rican. Whether the housing unit is or is not in the central city is introduced to account for some of the location rent effects.

Rents are expected to be higher in neighborhoods that are inhabited by high income or high status families, that have high valued housing, or that have a high fraction of single family houses. They are expected to decline as vacancy rates rise. The racial composition of the neighborhood and the race of the head are introduced to test for price differentials. Lower density structures are expected to have less negative coefficients than higher density structures, and newer structures are expected to have more positive coefficients than older ones. We expect that longer lengths of residency will lead to lower rents due to landlord-tenant relationships, and under-crowding to have a positive coefficient. The coefficients of all the other variables should be positive.

The analysis has been restricted to the rental market because there are too few black homeowners (28) on the file to study owner-occupied housing. Unfortunately, the price effects confronting black households may become stronger at the interface between these two markets. The only way to merge the two markets would be to convert house values to monthly rent equivalents. However, so little is known about capitalization rates (their values as well as whether they vary by neighborhood) that the risks of such a merger outweigh the benefits.

Unified Housing Market

We start with an estimate of Schnare's (step one) equation which represents a unified housing market. The results, which are summarized in Table 2, are nearly identical to Schnare's; differences are probably due to slight differences in the sample size. Schnare had 3,985 observations compared to our 3,941 observations. One exception is the coefficient of central air conditioning which is only half the size of Schnare's; our coefficient for proportion vacant is also somewhat larger (-0.61 versus -0.78).

The model explains 47 percent of the variation and nearly all the coefficients behave as expected and are statistically different from zero at the five percent level of significance. The age of structure dummies indicate that very old structures rent for more than structures built during 1940-1959 which is unexpected if age is viewed as a proxy for quality. However, the usefulness of age as a quality proxy depends on the maintenance history of buildings. In addition, the quality of construction has probably declined since 1940 because of the increased cost of labor. As a result, the sign of age is ambiguous, and there are reasonable explanations of the observed pattern. The sign of the coefficients of undercrowding and neighborhood density are inconsistent with our expectations. While we expected otherwise identical units to rent for more in single family than in multifamily neighborhoods, our results indicate the reverse. One explanation is that this density measure may be proxying the location rents that are only partially taken into consideration by the central city - suburban dummy variable. Since Schnare did not include any

Table 2. Hedonic Price Index for a Unified Boston Urbanized Area
Housing Market: 1970.

<u>Variables</u>	<u>ln(Gross Rent)*</u>
Ln (Rooms)	0.2964 (22.2)
Central Heat (Yes = 1)	0.0803 (5.19)
Two-family Structure (Yes = 1)	-0.0879 (-3.71)
Three or more units in Structure (Yes = 1)	-0.1067 (-4.58)
Central Air Conditioning (Yes = 1)	0.1652 (12.1)
Basement (Yes = 1)	0.0709 (3.41)
One and one-half bathrooms (Yes = 1)	0.1535 (5.16)
Two or more bathrooms (Yes = 1)	0.2843 (8.29)
Structure built 1960-1970 (Yes = 1)	0.1699 (9.59)
Structure built 1950-1959 (Yes = 1)	-0.1246 (-6.19)
Structure built 1940-1949 (Yes = 1)	-0.0503 (-2.69)
Complete Plumbing (Yes = 1)	0.2648 (10.7)
Less than 0.5 Persons per Room (Yes = 1) (Undercrowding)	-0.0679 (-6.89)
Length of Residency (7 to 20 years)** (Yes = 1)	-0.1168 (-10.1)
Located in Central City (Yes = 1)	0.0489 (3.97)
Proportion of Units in Single-family Structures	-0.1073 (-3.34)

Table 2 (cont.)

Proportion of Units in Structures with 5 or more units	0.1160 (3.56)
Average Neighborhood Income (1000's) (ANI)	0.0064 (1.69)
Proportion High Status (PHS)	0.1775 (2.33)
Proportion High Valued Units (PHV)	0.5626 (11.1)
Proportion Vacant Units (PV)	-0.6146 (-3.20)
Proportion Black	-0.0810 (-1.88)
Black Household Head (Yes = 1)	0.0431 (1.56)
Proportion Puerto Rican	-0.0837 (-0.34)
Puerto Rican Household Head (Yes = 1)	0.0395 (0.65)
Constant	3.8941 (71.3)
Corrected R-square	0.47
Sample Size	3941
F	138.7
Standard error of the estimate	0.3036

* The numbers in parentheses are the calculated t-ratios for the null hypothesis that the coefficient is zero.

** This length variable is the one used by Schnare in her May 1975 paper.

density measures in her second step equation, which includes a more detailed location variable, we cannot use her results to assess this explanation. (It is not clear why Schnare excludes a density measure.)

The dummy variable for race of household head indicates that blacks pay 4.3 percent more than whites throughout the urbanized area, a result which is significant at the 12 percent (two-tail test) level. Puerto Ricans pay 3.95 percent more than whites, but the result is not significantly different than zero at even a 50 percent level. Both of these estimates of individual markups are somewhat higher than Schnare's. These dummy variables would measure the extent of pure racial price discrimination in a unified housing market. The results offer limited support for this view for blacks but not Puerto Ricans. The proportion of persons in the neighborhood that are black (Puerto Rican) is a gross effort to pick up neighborhood price differentials. This approach would be relatively more successful for the taste differential theory than for the collusive behavior theory because the former theory suggests a rather continuous pattern of neighborhood price differentials as a function of the racial composition of the neighborhood. On the other hand, the collusive behavior-dual housing market theory suggests that comparisons which do not allow the prices of individual attributes to vary across racial submarkets could very well produce results that could be misinterpreted as an overall ghetto discount. However, the Kain and Quigley study, which assumes a dual housing market, uses the proportion white and not the race of the household head because they hypothesize that whites and blacks pay the same

prices within each racially delineated neighborhood, and obtain results for St. Louis indicating that comparable rental units rent for 3.8 percent more in an all-black area than in an all-white area.³⁷ Our (and Schnare's) results lead to the opposite conclusion: comparable units rent for 8.1 percent less in an all-black neighborhood than in an all-white one, which is statistically significant at the 6 percent (two-tail) level. We will show in the following sections that the restriction to a unified housing market has masked important neighborhood price differentials. In addition, we will also examine Kain and Quigley's hypothesis that blacks and whites pay the same prices within each racial submarket.

Dual Housing Market

The dual housing market postulates the existence of relatively independent submarkets with significant barriers between them such that the structure of the relative prices of the attributes of the housing bundle may differ. We will examine this hypothesis by dividing the Boston urbanized area into four submarkets which are delineated on the basis of location and the racial composition of the neighborhood. The four submarkets are: central city ghetto (areas the size of census tracts that are 60 percent or more black); central city transition area (20 to 49 percent black); central city white area (less than 20 percent black); and the suburban white area.³⁸ (All areas in the suburbs had less than 20 percent black populations.)

Shown in Table 3 are the hedonic price equation estimates for

Table 3. Hedonic Price Indexes for Four Housing Submarkets in the Boston Urbanized Area: 1970.

Variables	ln (Gross Rent)*			
	Central City Ghetto	Central City Transition Area	Central City White Area	Suburban White Area
ln (Rooms)	0.3875 (5.85)	0.4362 (5.71)	0.2584 (11.5)	0.3381 (18.9)
Central Heat	-0.0053 (-0.10)	0.0622 (0.81)	0.0996 (3.81)	0.0685 (3.29)
Two-family Structure	0.0595 (0.40)	-0.0904 (-0.61)	0.0743 (1.18)	-0.1019 (-3.85)
Three or more units	-0.0001 (-0.00)	-0.1408 (-1.21)	0.0557 (0.93)	-0.1090 (-4.11)
Central Air Conditioning	0.2888 (2.97)	0.2550 (2.26)	0.1747 (6.64)	0.1471 (9.05)
Basement	-0.0491 (-0.59)	-0.0790 (-0.41)	0.0590 (1.33)	0.0871 (3.54)
One and one-half bathrooms	-0.1252 (-0.62)	0.0115 (0.06)	0.1196 (2.04)	0.1809 (5.15)
Two or more bathrooms	-0.4543 (-1.57)	0.4414 (1.54)	0.4248 (6.78)	0.2388 (5.80)
Structure built 1960-1970	0.0040 (0.04)	-0.0569 (-0.30)	0.2316 (6.52)	0.1796 (8.46)
Structure built 1950-59	-0.2356 (-3.77)	-0.3597 (-3.76)	-0.1948 (-4.32)	-0.0458 (-1.81)
Structure built 1940-49	-0.1535 (-2.24)	-0.2494 (-3.05)	-0.0322 (-0.90)	-0.0033 (-0.14)
Complete Plumbing	-0.0646 (-0.71)	-0.0191 (-0.17)	0.3172 (8.22)	0.2863 (8.06)
Undercrowding	-0.1297 (-3.32)	0.0188 (0.36)	-0.0735 (-4.11)	-0.0619 (-4.96)
Length of residency	-0.0565 (-1.19)	-0.1491 (-2.28)	-0.1013 (-4.78)	-0.1267 (-8.78)
Proportion of units in single-family structures	-0.3754 (-0.96)	-1.1338 (-1.24)	-0.4186 (-4.34)	-0.0196 (-0.49)
Proportion of units in structures with 5 or more units	-0.1222 (-1.03)	0.1339 (0.39)	-0.0495 (-0.94)	0.1522 (2.71)

Table 3 (cont.)

Average Neighborhood Income	0.0772 (2.72)	0.0324 (0.71)	0.0043 (0.87)	-0.0024 (-0.41)
Proportion High Status	0.4425 (0.48)	-1.3744 (-0.89)	0.4872 (2.52)	0.0492 (0.55)
Proportion high-valued units	0.3618 (1.21)	0.6347 (0.95)	0.6771 (4.82)	0.5762 (9.36)
Proportion vacant units	-0.5116 (-1.08)	-2.1453 (-1.95)	-0.4969 (-1.57)	-0.8052 (-2.34)
Constant	3.876 (15.3)	4.428 (8.86)	3.785 (39.1)	3.900 (51.8)
Corrected R-square	0.43	0.45	0.50	0.47
Sample size	225	131	1166	2419
F	9.29	6.34	58.4	108.0
Standard error of the estimate	0.2772	0.2714	0.2958	0.3010

* The numbers in parentheses are the calculated t-ratios for the null hypothesis that the coefficient is zero.

each of these submarkets. The estimates have the same functional form and independent variables as those in Table 2. The one exception is the elimination of the variables describing the racial composition of the neighborhood because of its use in stratifying the submarkets. The dummy variables on the race of the head have also been excluded to provide an equation that is analogous to Kain and Quigley's.³⁹ The null hypothesis that the four sets of coefficients is homogeneous can be rejected at the 0.01 level of significance ($F(63,3857) = 3.89$). The unified housing market model in Table 2 is also rejected at the 0.01 level ($F(58,3857) = 3.81$).⁴⁰

It is evident from Table 3 that the estimated attribute prices vary by submarket. Several attributes (basements, central heat, additional bathrooms and complete plumbing facilities) are less costly within the ghetto than in the white areas. Central heat adds 6.9 percent to the rent in the suburban white area but virtually nothing in the ghetto. A basement adds 8.7 percent in the suburbs but brings a 5 percent discount in the ghetto. Others (rooms, air conditioning and neighborhood quality as measured by average income) are more costly in the ghetto. Central air conditioning adds 28.9 percent to gross rents in the ghetto but only 14.7 percent in the suburbs. The coefficient of average neighborhood income in the ghetto is 18 times the value in the central city white area indicating that better quality neighborhoods are very expensive in the ghetto. The pattern of relative prices for some of the other attributes is not consistent across the four submarkets. Some of the inconsistent

parameter estimates may be due to the limited range of housing attributes available in the ghetto. In addition, the low cost of new structures (1960-1970) in the ghetto relative to the white areas may be caused by the large role of subsidized housing in new construction within the ghetto.

We can compare the cost of comparable bundles of housing attributes across the four submarkets by solving the four equations in Table 3, using the average characteristics of the properties in each submarket. The gross monthly rent for the average ghetto housing bundle is \$103 in the ghetto and is estimated to be \$104 in the transition area, \$101 in the central city white area and \$105 in the suburban white area. Ghetto residents are able to purchase the ghetto housing bundle at a discount relative to the suburban white area. However, they must pay markups to improve housing quality above the ghetto bundle. For example, the average central city white area housing bundle costs \$155 in the ghetto and \$120 in the white areas, which is a 28.5 percent markup. These results are summarized in Table 4 in terms of the percentage differences. It is evident from Table 4 that ghetto residents pay substantial markups for higher quality housing bundles and small discounts for low quality housing bundles. This is clearly a more complex pattern than the simplistic view of the unified housing market. At the same time, sizeable discounts on the higher quality bundles appear to be available in the transition area. Schnare and Struyk argue that one of the reasons that the unified housing market model did not indicate a price markup

Table 4. Estimated Markups for Several Housing Bundles in Three Neighborhoods
Relative to the Price in the Suburban White Area (percent)

Various Housing Bundles	Central City Ghetto	Central City Transition	Central City White Interior
Average ghetto housing bundle	-1.9	-1.0	-3.8*
Average transition area housing bundle	3.7	-0.9	-7.5*
Average central city white area housing bundle	28.5*	-0.4	-0.4
Average suburban white area housing bundle	36.4*	-15.6*	2.2*
Average urbanized area housing bundle	29.4*	-10.3*	2.4

* The differences in estimated prices between the indicated submarket and the suburban white area are significantly different than zero at the 0.05 level (two-tailed test).

in 1970 was an over supply of housing available to blacks in the transition areas.⁴¹ Perhaps this explains the discounts in these areas.

Kain and Quigley's hypothesis that blacks and whites pay the same prices within each submarket is tested by reestimating the four equations in Table 3 with a dummy variable for the race of the household head. The remaining coefficients and the pattern of price differentials remained virtually the same. However, the new variable indicates that blacks pay 17.8 percent more than whites for comparable housing in the ghetto, a result that is statistically significant at the 0.01 level. This result not only suggests that there is pure racial price discrimination but also that it occurs because of the racial prejudice of the landlords. Blacks also pay more (6.7 percent) than whites in the central city white area, but pay less in the transition area (5.9 percent) and the suburban white area (2.1 percent); none of these were statistically significantly different than zero at the 0.10 level.

The substantial price differential between whites and blacks within the ghetto casts some doubt on Kain and Quigley's hypothesis. To further examine this hypothesis, we estimate separate equations for whites and blacks in each of the four neighborhoods. The estimated equations are reported in Appendix Tables 1 and 2.

An analysis of covariance for each pair of black and white equations by submarket shows that the null hypothesis of homogeneous coefficients can be rejected for the ghetto ($F(19,185) = 2.55$) and the transition area ($F(18,92) = 4.56$) but not for the central city white area ($F(20,1125) = 1.35$) and the suburbs ($F(18,2380) = 0.81$).

Table 5 summarizes the percentage markups that blacks pay in the

Table 5. Estimated Markups in Prices Paid by Blacks for Several Housing Bundles in Three Neighborhoods Relative to the Suburban White Area (percent) (based on black equations).

Various Housing Bundles	Central City Ghetto	Central City Transition Area	Central City White Area
Average Bundle Consumed by Blacks Living in the			
Central City Ghetto	-18.5*	-17.7*	-19.4*
Central City Transition Area	- 9.0*	-11.2*	-20.5*
Central City White Area	5.6	13.1*	- 8.6
Suburban White Area	48.2*	100.2*	-57.4*
Average Bundle Consumed by Whites Living in the			
Central City Ghetto	-35.1*	-43.5*	-28.7*
Central City Transition Area	-10.5*	- 9.9*	-16.5*
Central City White Area	29.3*	44.1*	0.7
Suburban White Area	19.6*	145.4*	- 6.2
Average Bundle Consumed by Blacks and Whites in the Urbanized Area	15.5*	88.3*	- 5.7

* The differences in estimated black prices between the indicated submarket and the suburban white area are significantly different than zero at the 0.05 level (two-tailed test).

three central city areas relative to prices that blacks pay in the suburban white area for each of nine possible housing bundles: the average bundles consumed by blacks in each of the four submarkets; the average bundles consumed by whites in the four submarkets, and the average bundle consumed by blacks and whites in the entire urbanized area. The estimated prices were calculated from the black equations (Appendix Table 1) using the nine sets of average characteristics. Table 6 summarizes the same calculations for whites and is based on the white equations (Appendix Table 2).

Table 5 again shows that blacks are able to purchase low-quality ghetto housing bundles at a discount but have to pay large mark-ups for better housing. These markups are of the order of 6 to 48 percent in the ghetto and even higher in the transition area (13 to 145 percent). The markups get steeper for the higher quality housing bundles, which are the suburban ones. These results are consistent with the dual housing market view which suggests that some bundles of housing attributes might actually be cheaper in the ghetto while others are much more expensive in the ghetto.

Table 6 shows that whites are able to purchase all nine bundles at substantial discounts and that the discounts are larger in the ghetto than in the transition area. The discounts range from 5 to 67 percent in the ghetto. This pattern of white prices is consistent with the price relationships that are predicted on the basis of a strong white taste for racial segregation.

Table 7 compares the price that blacks would pay for each of the

Table 6. Estimated Markups in Prices Paid by Whites for Several Housing Bundles in Three Neighborhoods Relative to the Suburban White Area (percent) (based on white equations).

Various Housing Bundles	Central City Ghetto	Central City Transition Area	Central City White Area
Average Bundle Consumed by Blacks Living in the			
Central City Ghetto	- 9.4*	4.3	-4.8*
Central City Transition Area	-24.9*	-5.7	-5.7*
Central City White Area	-35.3*	-2.5	3.9*
Suburban White Area	-67.5*	-11.7*	-3.4*
Average Bundle Consumed by Whites Living in the			
Central City Ghetto	-17.6*	-5.9*	-5.5*
Central City Transition Area	- 5.4	5.9	-2.7*
Central City White Area	-29.2*	4.4	5.9*
Suburban White Area	-53.3*	-35.3*	0.5
Average Bundle Consumed by Blacks and Whites in the Urbanized Area	-43.9*	-22.2*	1.6*

* The differences in estimated white prices between the indicated submarket and the suburban white area are significantly different than zero at the 0.05 level (two-tailed test).

Table 7. Percent Markups of Black relative to White prices for several housing bundles in four submarkets defined on a racial and geographic basis.

Various Housing Bundles	Central City Ghetto	Central City Transition Area	Central City White Area	Suburban White Area
Average Bundle Consumed by Blacks living in the				
Central City Ghetto	13.5*	-0.3	7.0	26.3*
Central City Transition Area	31.2*	2.2	-8.6	8.3
Central City White Area	98.6*	41.2*	7.1	21.8*
Suburban White Area	515.6*	206.3*	-41.1*	35.0*
Average Bundle Consumed by Whites living in the				
Central City Ghetto	19.0*	-9.4*	13.9*	51.0*
Central City Transition Area	18.1*	6.2	7.0	24.7*
Central City White Area	97.2*	49.0*	2.7	8.0
Suburban White Area	195.1*	353.9*	11.7*	19.7*
Average Bundle Consumed by Blacks and Whites in the urbanized area				
	140.0*	182.3*	8.2	16.6*

* The differences in estimated black and white prices are significantly different than zero at the 0.05 level (two-tailed test).

nine bundles to the price that whites would pay in each of the four submarkets. The black/white prices were calculated using the equations in Appendix Tables 1 and 2, respectively. Table 7 shows the percent increase of the black price over the white price in each submarket. Blacks pay more than whites for every bundle in nearly all submarkets. There are only four exceptions among the 36 comparisons. These comparisons suggest that there is a substantial amount of pure racial price discrimination in the Boston urbanized area. At the same time, the differential between blacks and whites is not uniform across neighborhoods, but varies from none to over 500 percent.

Summary

We have uncovered substantial neighborhood mark-ups that blacks must pay in the ghetto and transition area if they are to increase their housing consumption. On the other hand we have also observed a willingness of whites to pay more for otherwise identical housing that is located further from black residence areas. And we have also seen that blacks nearly always pay more than whites for the same bundle of housing attributes at the same location. These findings are consistent with all three theories of racial discrimination. The dual housing market, a strong white taste for segregation, and pure racial price discrimination are all operative in the Boston urbanized area. Schnare's simplistic view of the housing market masked these important price differentials by assuming that the implied attribute prices

were constant across races and neighborhoods. Policies to counteract the historical pattern of racial segregation must be cognizant of all three forces to be successful.

Footnotes

* This Research was supported by a grant from the Milton Fund at Harvard University. The author is grateful to John F. Kain and John M. Yinger for helpful comments.

1. Karl E. Taeuber and Alma F. Taeuber, Negroes in Cities (Chicago: Aldine, 1965).
2. For example, Ronald G. Ridker and John A. Henning, "The Determinants of Residential Property Values With Special Reference to Air Pollution," Review of Economics and Statistics 44 (May, 1967), pp. 246-57 (20 percent); Richard F. Muth, Cities and Housing, Chicago: University of Chicago Press, 1969 (30 percent for owners and 5 percent for renters); A. Thomas King and Peter Mieszkowski, "Racial Discrimination, Segregation and the Price of Housing", Journal of Political Economy (May/June 1973), pp. 590-606 (7 to 16 percent); John F. Kain and John M. Quigley, "Measuring the Value of Housing Quality," Journal of the American Statistical Association (June 1970), pp. 532-48 (8 percent). For a discussion of some of the earlier studies see Robert Schafer, "Slum Formation, Race and an Income Strategy," Journal of the American Institute of Planners, 37 (September 1971), pp. 347-54. For a more recent discussion see John M. Quigley, "Racial Discrimination and the Housing Consumption of Black Households," Patterns of

Racial Discrimination Vol. I: Housing, edited by George M. von Furstenberg, Bennett Harrison and Ann R. Horowitz (Lexington, Mass.: D.C. Heath, 1974) pp. 121-37, and other articles in this volume. See also John F. Kain and John M. Quigley, Housing Markets and Racial Discrimination (New York: National Bureau of Economic Research, 1975).

The only exceptions were Martin J. Bailey, "Effects of Race and Other Demographic Factors on the Values of Single-Family Homes," 42 Land Economics (May 1966) pp. 215-20; and Victoria Lapham, "Do Blacks Pay More for Housing?" 79 Journal of Political Economy (Nov./Dec. 1971) pp. 1244-57. The Lapham study is very weak because it ignores the impact of neighborhood characteristics and public services on property values.

3. Ann B. Schnare, "Externalities, Segregation, and Housing Prices," No. 208-24 (Washington, D.C.: The Urban Institute, 1974); and Ann B. Schnare and Raymond J. Struyk, "An Analysis of Ghetto Housing Prices Over Time," in G. Ingram (ed.), The Economics of Residential Location and Urban Housing Markets (New York: National Bureau of Economic Research Conference on Income and Wealth, May, 1975).
4. Brian J. L. Berry, "Ghetto Expansion and Housing Prices," paper prepared for the C.U.E. Conference on Economics of

the Ghetto at the University of Wisconsin, May 1975, p. 40.

5. *Clark v Universal Builders, Inc.*, 501 F. 2d 324 (7th Cir. 1974), cert. denied, ___ U.S. ___ (1975). The court stated that "neither prices nor profits-- whether derived through well-intentioned, good-faith efforts or predatory and unethical practices-- may reflect or perpetuate discrimination against black citizens... Price and profit differentials between individual buyers may be justified on a multitude of grounds... But price or profit may not turn on whether the prospective buyer has dark or light skin."
6. Martin J. Bailey, "Effects of Race and Other Demographic Factors on the Values of Single Family Homes," Land Economics (May 1966) pp. 215-20.
7. See Schnare, op. cit., pp. 3-7.
8. See Kain and Quigley, Housing Markets and Racial Discrimination, op. cit., pp. 56-91.
9. *Shelley v Kraemer*, 334 U.S. 1 (1948)
10. Thomas I. Emerson, David Haber, and Norman Dorsen, Political and Civil Rights in the United States (Boston: Little, Brown and Co., 3rd ed., 1967) pp. 2033-39. See also Charles

- Abrams, Forbidden Neighbors (New York: McGraw Hill, 1955) pp. 224-25.
11. Abrams, op. cit., pp. 227-43, and Davis McEntire, Residence and Race (Berkeley, California: University of California Press, 1960) pp. 299-308, 319-28.
 12. Abrams, op. cit., pp. 150-68; McEntire, op. cit., pp. 238-50; and Jack Rothman, "The Ghetto Makers," Housing Urban America, edited by Jon Pynoos, Robert Schafer and Chester Hartman (Chicago: Aldine, 1973) pp. 274-78.
 13. Donald L. Foley, "Institutional and Contextual Factors Affecting the Housing Choices of Minority Residents," Segregation in Residential Areas (Washington, D.C.: National Academy of Sciences, 1973) pp. 85, 99-100.
 14. McEntire, op. cit., pp. 176-83.
 15. Ibid., pp. 181-82.
 16. Ibid., pp. 224-28, 236.
 17. Executive Order No. 11063, 27 Federal Register 11527 (1962); United States Commission on Civil Rights, Civil Rights '63 (Washington, D.C.: U.S. Government Printing Office, 1963) pp. 95-103.

18. Jones v Alfred H. Mayer Co., 392 U.S. 409 (1968)
19. Shannon v Department of Housing and Urban Development, 436 F.2d 809 (1970), and Gautreaux v Romney, 448 F. 2d 731 (7th Cir., 1971)
20. The ordeals of one black family that moved into a white section of New York City in 1974 received widespread publicity in the local press. See Jill Gerston, "Home of Blacks Struck by Bomb: Queens Residence Damaged a Second Time - 'Klan' Note Is Attached," New York Times, January 1, 1975, p. 21; George Vecsey, "Neighborhood: Surprised Rosedale Lays Bombing to 'a Couple of Nuts'," New York Times, January 8, 1975, p. 35; George Vecsey, "Rosedale Still Tense 5 Weeks After Blast," New York Times, February 6, 1975, p. 35; Eleanor Blau, "Black Couple in Home Bombing Shot in Accident," New York Times, August 8, 1975, p. 31; Martin Waldron, "Arson Blamed in Fire at Home of a Black Family in Rosedale," New York Times, September 4, 1975.
21. William Brink and Louis Harris, "Supplementary Statistical Tables," Race and Poverty, edited by John F. Kain (Englewood Cliffs, N.J.: Prentice-Hall, 1969) pp. 144-45.
22. Thomas F. Pettigrew, "Attitudes on Race and Housing: A Social-

Psychological View," Segregation in Residential Areas
(Washington, D.C.: National Academy of Sciences, 1973)
pp. 21, 43, 51.

23. Schnare, op. cit., p. 11
24. Richard F. Muth, "Residential Segregation and Discrimination,"
Patterns of Racial Discrimination, Vol. I Housing, edited
by George M. von Furstenberg, Bennett Harrison and Ann R.
Horowitz (Lexington, Mass.: D.C. Heath, 1974) p. 112.
25. Clark v Universal Builders Inc., 501 F. 2d 324 (7th Cir. 1974),
cert. denied, ___ U.S. ___ (1975)
26. Muth, Cities and Housing, op. cit., pp. 299-300.
27. Ridker and Henning, op. cit.
28. Kain and Quigley, Housing Markets and Racial Discrimination,
op. cit., p. 217
29. King and Mieszkowski, op. cit., p. 601
30. Bailey, op. cit.
31. Lapham, op. cit.

32. For example, Zvi Griliches, ed., Price Indexes and Quality Change (Cambridge, Mass.: Harvard University Press, 1971), and Robert Schafer, The Suburbanization of Multifamily Housing (Lexington, Mass.: D.C. Heath, 1974), pp. 67-89.
33. See U.S. Bureau of the Census, Public Use Samples of Basic Records From the 1970 Census: Description and Technical Documentation (Washington, D.C.: 1972).
34. William C. Apgar, Jr. and John F. Kain, "Neighborhood Attributes and the Residential Price Geography of Urban Areas," (paper presented at the Winter Meetings of the Econometric Society, Toronto, Ontario, Canada, December 28-30, 1972); John F. Kain, William C. Apgar, Jr., J. Royce Ginn, and Gregory K. Ingram, First Interim Report on Contract to Improve the NBER Urban Simulation Model and To Use the Improved Model to Analyze Housing Market Dynamics and Abandonment (Cambridge, Mass.: National Bureau of Economic Research, 1973) Appendix E ("Boston's Residential Price Geography: A Replication.") Apgar and Kain also used the fraction of housing units built before 1940. We included this in our original equation but dropped it to facilitate comparison with Schnare's results. The additional variables introduced by Schnare appear to have neutralized this change.

35. Proportion high status is defined as one half the sum of the proportion of workers who are professional, technical and kindred workers, or managers and administrators except farm, and the proportion of persons 25-54 years old that have four or more years of college. Schnare and Struyk, op. cit., p. 50.
36. Proportion high valued is defined as a weighted average of the proportion of owner-occupied dwelling units in a neighborhood that have values of \$25,000 or more and the proportion of renter-occupied units in the area that rent for \$150 or more per month. The weights are the proportion of dwelling units in the neighborhood that are owner-occupied and renter-occupied, respectively. Schnare and Struyk, op. cit., p. 50.
37. Kain and Quigley, Housing Markets and Racial Discrimination, op. cit., pp. 203, 208.
38. There are no areas (the size of census tracts) with a 50 to 59 percent black population in the sample used in this analysis.
39. Kain and Quigley, Housing Markets and Racial Discrimination, op. cit., p. 213 (Table 8.4).

40. The difference of this test from the first homogeneity test is that Table 2's model includes racial variables that were not present in the first test.

41. Schnare and Struyk, op. cit., p. 31.

Appendix Table 1. Hedonic Price Indexes for Black Households in Four Submarkets in the Boston Urbanized Area: 1970.

Variables	ln (Gross Rent)*			
	Central City Ghetto	Central City Transition Area	Central City White Area	Suburban White Area
ln (Rooms)	0.3380 (4.78)	0.2257 (1.81)	-0.1944 (0.83)	0.0742 (0.40)
Central Heat	-0.0344 (-0.59)	0.2601 (1.64)	-0.0105 (-0.03)	-0.0005 (-0.00)
Two-family structures	0.0435 (0.30)	NV	0.7729 (1.60)	0.4621 (1.68)
Three or more units	-0.0352 (-0.25)	-0.4957 (-1.76)	0.7120 (1.27)	0.4811 (1.86)
Central Air Conditioning	0.2322 (2.37)	0.2589 (0.95)	0.0311 (0.09)	0.3287 (1.86)
Basement	-0.0193 (-0.22)	-0.2684 (-1.33)	0.8129 (2.12)	-0.2550 (-0.97)
One and one-half bathrooms	-0.0985 (-0.52)	0.4816 (1.60)	0.1680 (0.25)	0.6829 (2.37)
Two or more bathrooms	-0.3924 (-1.44)	NV	NV	NV
Structure built 1960-1970	0.0038 (0.04)	-0.0054 (-0.02)	0.9432 (2.11)	0.2229 (1.03)
Structure built 1950-1959	-0.1969 (-2.76)	-0.2071 (-1.49)	-0.3717 (-1.00)	-0.3600 (-1.76)
Structure built 1940-1949	-0.1908 (-2.64)	-0.1209 (-1.13)	-0.3648 (-1.85)	NV
Complete Plumbing	-0.1308 (-1.37)	-0.2556 (-1.62)	0.7373 (2.64)	NV
Undercrowding	-0.1152 (-2.74)	0.0904 (1.07)	-0.1788 (-1.14)	0.1407 (1.13)
Length of Residency	-0.0549 (-1.03)	-0.0546 (-0.58)	-0.2442 (-0.80)	-0.2792 (-1.93)
Proportion of units in single-family structures	-0.5645 (-1.44)	2.4732 (1.60)	-0.1138 (-0.08)	-0.0797 (-0.13)
Proportion of units in structures with 5 or more units	-0.1104 (-0.81)	0.8420 (1.37)	-0.6204 (-1.26)	-0.6860 (-1.39)

Appendix Table 1 (cont.)

Average Neighborhood Income	0.0653 (2.21)	0.0891 (1.04)	-0.0039 (-0.08)	-0.0516 (-0.58)
Proportion High Status	1.0418 (1.04)	-1.6677 (-0.64)	-1.2192 (-0.63)	-1.1183 (-1.12)
Proportion High-Valued Units	0.5056 (1.53)	1.0747 (1.11)	2.2144 (1.39)	2.1940 (1.98)
Proportion Vacant Units	-0.3179 (-0.66)	-1.0610 (-0.66)	2.8130 (1.31)	2.1574 (0.59)
Constant	4.056 (15.2)	4.020 (4.41)	2.821 (3.40)	4.832 (5.44)
Corrected R-square	0.34	0.61	0.44	0.39
Sample size	178	48	34	35
F	5.64	5.00	2.35	2.29
Standard error of the estimate	0.2585	0.2221	0.3290	0.2598

* The numbers in parentheses are the calculated t-ratios for the null hypothesis that the coefficient is zero.

NV This variable exhibited no variation in this submarket for this race.

Appendix Table 2. Hedonic Price Indexes for White Households in Four Submarkets in the Boston Urbanized Area: 1970.

Variables	ln (Gross Rent)*			
	Central City Ghetto	Central City Transition Area	Central City White Area	Suburban White Area
ln (Rooms)	0.4019 (2.36)	0.4332 (4.42)	0.2656 (11.7)	0.3404 (18.9)
Central Heat	-0.1082 (-0.91)	-0.0242 (-0.28)	0.0928 (3.50)	0.0675 (3.20)
Two-family structures	**	-0.1184 (-0.76)	0.0830 (1.28)	-0.1035 (-3.87)
Three or more units	-0.2278 (-1.31)	-0.0932 (-0.69)	0.0638 (1.02)	-0.1101 (-4.11)
Central air conditioning	0.1443 (0.25)	0.2687 (2.14)	0.1727 (6.53)	0.1474 (8.97)
Basement	-0.2414 (-1.32)	NV	0.0427 (0.94)	0.0850 (3.41)
One and one-half bathrooms	NV	-0.0620 (-0.29)	0.1128 (1.86)	0.1769 (4.97)
Two or more bathrooms	NV	0.4071 (1.43)	0.4301 (6.89)	0.2375 (5.75)
Structure built 1960-1970	0.2218 (0.44)	-0.1896 (-0.99)	0.2139 (5.95)	0.1792 (8.35)
Structure built 1950-59	-0.5317 (-3.06)	-0.4599 (-3.03)	-0.1941 (-4.28)	-0.0427 (-1.67)
Structure built 1940-49	0.0095 (0.06)	-0.3234 (-2.29)	-0.0229 (-0.62)	-0.0034 (-0.14)
Complete Plumbing	1.0137 (3.80)	0.2706 (1.85)	0.3218 (8.15)	0.2857 (8.02)
Undercrowding	-0.0738 (-0.77)	-0.0352 (-0.52)	-0.0760 (-4.21)	-0.0624 (-4.96)
Length of residency	-0.0718 (-0.73)	-0.1411 (-1.60)	-0.1049 (-4.94)	-0.1274 (-8.75)
Proportion of units in single-family structures	-2.9713 (-1.11)	-2.2954 (-1.94)	-0.4291 (-4.42)	-0.0158 (-0.39)
Proportion of units in structures with 5 or more units	-0.4449 (-1.95)	0.2232 (0.53)	-0.0463 (-0.87)	0.1605 (2.83)

Appendix Table 2 (cont.).

Average Neighborhood Income	0.0959 (1.14)	0.0192 (0.37)	0.0050 (1.00)	-0.0030 (-0.52)
Proportion High Status	-2.2669 (-0.98)	-0.9045 (-0.44)	0.5134 (2.61)	0.0603 (0.66)
Proportion High-Valued Units	-0.4487 (-0.42)	0.7156 (0.84)	0.6644 (4.69)	0.5710 (9.23)
Proportion Vacant Units	-1.8364 (-0.95)	-2.6722 (-1.83)	-0.6157 (-1.90)	-0.8465 (-2.43)
Constant	3.9103 (6.07)	4.355 (8.28)	3.784 (38.1)	3.907 (51.4)
Corrected R-square	0.64	0.47	0.50	0.47
Sample Size	47	83	1132	2384
F	5.78	4.76	57.6	106.8
Standard error of the estimate	0.2555	0.2633	0.2943	0.3015

* The numbers in parentheses are the calculated t-ratios for the null hypothesis that the coefficient is zero.

** Since there were no single-family houses in this sample, this variable was deleted to avoid the dummy variable trap.

NV This variable exhibited no variation in this submarket for this race.

TABLE 1

Percent of Families Living in Suburban Ring of 15 Largest Standard
Metropolitan Statistical Areas by Race and Income: 1970.

	WHITE			NEGRO		
	Families of All Incomes	Families with Low Incomes*	Families with High Incomes*	Families of All Incomes	Families with Low Incomes*	Families with High Incomes*
New York	37.0	24.5	40.0	10.3	7.5	12.7
Los Angeles-Long Beach	58.5	56.2	58.0	30.2	26.7	32.3
Chicago	62.0	46.3	64.7	9.8	6.5	11.3
Philadelphia	67.3	56.1	70.0	21.5	18.9	23.0
Detroit	74.9	62.3	77.2	12.0	11.4	11.3
San Francisco-Oakland	72.1	61.8	73.7	32.8	29.4	35.2
Washington, D.C.	92.4	90.9	91.8	23.0	18.2	24.3
Boston	81.7	70.5	84.6	16.8	9.1	28.7
Pittsburgh	82.3	78.0	82.8	37.5	34.0	39.3
St. Louis	81.7	72.2	84.2	33.0	34.6	35.4
Baltimore	69.2	54.4	72.4	13.1	10.0	15.4
Cleveland	74.2	53.8	79.2	13.7	6.5	20.0
Houston	55.1	49.4	42.0	15.7	20.5	10.1
Newark	90.2	75.4	92.7	41.4	27.7	54.0
Minneapolis-St. Paul	60.2	42.0	63.7	6.9	0.8	13.4

+ "White" includes all families except those headed by a Negro or by a Spanish American.

* "Families with low income" are families with incomes below the poverty cut-off as defined by the Social Security Administration for 1969. "Families with high incomes" are families with incomes that are greater than or equal to three times the poverty cutoff.

Source: U.S. Bureau of the Census, Census of Population:1970. Detailed Characteristics. United States Summary. Final Report PC (1) - D1 (Washington, D.C.: U.S. Government Printing Office, 1973) Tables 368 and 371.